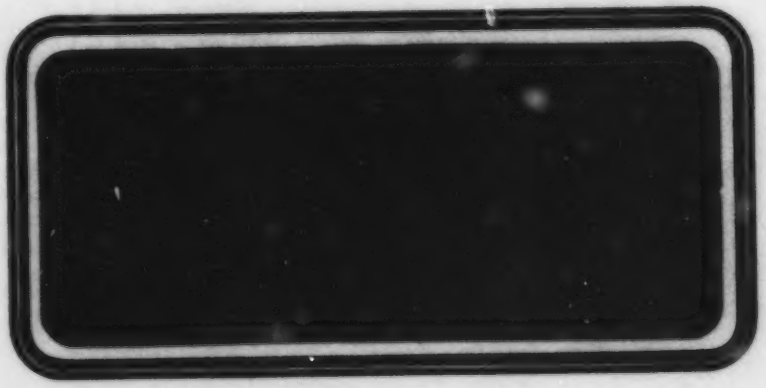
Canada Alberta

FOREST RESOURCE DEVELOPMENT AGREEMENT
ENTENTE SUR LA MISE EN VALEUR DES RESSOURCES FORESTIERES



Canada Alberta

The Canada-Alberta Forest Resource Development Agreement is a subsidiary agreement of the Canada-Alberta Economic and Regional Development Agreement, which provides coordination and cooperation between the governments of Alberta and Canada in areas of Alberta's economic development.

The Canada-Alberta Forest Resource Development Agreement is funded equally by the governments of Canada and Alberta, from April 1, 1984, to March 31, 1989.

Its primary objectives are to ensure the long-term availability of timber supplies; to optimize timber uses; and to contribute to the growth and diversification of Alberta's economy.

The Agreement comprises three programs: Reforestation; Applied research, technology transfer and opportunity identification; and Public information, evaluation and administration. These programs are managed by a joint Directorate and are implemented by Forestry Canada and the Alberta Forest Service.

L'Entente Canada-Alberta sur la mise en valeur des ressources forestières est auxiliaire à l'Entente Canada-Alberta sur le développement économique et régional, qui vise à assurer la coordination et la coopération des deux gouvernements relativement au développement économique de l'Alberta.

L'Entente Canada-Alberta sur la mise en valeur des ressources forestières est financée à parts égales par les gouvernements du Canada et de l'Alberta, et a cours du 1er avril 1984 au 31 mars 1989.

Ses objectifs principaux sont assurer la disponibilité à long terme de réserves de bois; optimiser leur utilisation; et contribuer à la croissance et la diversification de l'économie de la province.

L'Entente comprend trois programmes: Reboisement; Recherche appliquée, transferts de connaissances techniques et relevé des occasions; et Information, évaluation et administration. Ces programmes sont gérés par un Bureau de direction conjoint, et mis en oeuvre par Forêts Canada et le Service forestier de l'Alberta.

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BIRCH SUPPLY, LUMBER POTENTIAL AND COST IN ALBERTA

by

Jasper Millworks Ltd.[1]

and

Woodland Resource Services Ltd.[2]
Operated by
Pearson, Hasselfield and Assoc. Ltd.

This is a joint publication of the Canadian Forestry Service and the Alberta Forest Service pursuant to the Canada-Alberta Forest Resource Development Agreement

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DISCLAIMER

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TABLE OF CONTENTS

WHITECOURT AND SLAVE LAKE FOREST
BIRCH SUPPLY, LUMBER POTENTIAL AND COSTS

		PAGE
1.0	Executive Summary	1
2.0	Introduction	1
	2.1 Background	1
	2.1 Objectives	2
3.0	Work Done	2
	3.1 Whitecourt Forest	3
	3.2 Slave Lake Forest	3
	3.3 Firewood	3
	3.4 Analysis	4
4.0	Findings	4
	4.1 Whitecourt Forest	4
	4.2 Slave Lake Forest	8
	4.2.1 Aspen Cutblock	8
	4.2.2 Home Oil Trail	10
	4.3 Total Volumes by Area	13
	4.3.1 Whitecourt Area	13
	4.3.2 Slave Lake Area	13
	4.4 Access	13
	4.4.1 Whitecourt	13
	4.4.2 Slave Lake	13
	4.5 Firewood	13
	4.6 Logging Costs	14
	4.7 Drying and Finishing of Birch Lumber	15
5.0	Conclusions and Recommendations	15
	5.1 Conclusions	15
	5.2 Recommendations	19

LIST OF FIGURES

		PAGE
FIG. 1	Birch Selective Logging Area	5
FIG. 2	Local Logging Contractor's Birch Logs	5
FIG. 3	Local Logging Contractor's Birch Logs	6
FIG. 4	Clear Birch Lumber	6
FIG. 5	Birch Lumber Produced at Whitecourt Sawmill	7
FIG. 6	Birch Lumber Produced at Whitecourt Sawmill	8
FIG. 7	Aspen Cutblock (Marten Hills Road) - Cull Plot	9
FIG. 8	Aspen Cutblock (Marten Hills Road) - Cull Plot	9
FIG. 9	Overall View of Aspen Cutblock (Marten Hills Road)	10
FIG. 10	Home Oil Birch Stand (Marten Hills Road) - Cull Plot	11
FIG. 11	Home Oil Birch Stand (Marten Hills Road) - Cull Plot	11
FIG. 12	View of Home Oil Birch Stand (Marten Hills Road)	12
FIG. 13	View of Home Oil Birch Stand (Marten Hills Road)	12

LIST OF TABLES

TABLE 1	Volume of Clear, Birch Lumber After Drying and Finishing	16
TABLE 2	Volume of Clear, Birch Lumber After Drying and Finishing	17
TABLE 3	Volume of Clear, Birch Lumber After Drying and Finishing	18
TABLE 4	Volume of Clear, Birch Lumber After Drying and Finishing	18

1.0 EXECUTIVE SUMMARY

The objective of this study was to locate a supply of birch logs or rough lumber to be used by Jasper Millworks for the production of finished specialty items.

Originally, the study was set up in Chateh (Assumption), but due to severe cull problems in birch stands and a long haul distance to Edmonton, the study was relocated to the Whitecourt and Slave Lake Forests (see Appendix I).

In both forests, potential birch stands were located through discussions with Alberta Forest Service personnel, local logging contractors, and small sawmill operators. In the Slave Lake Forest, "deciduous-enhanced" forest cover type maps were also used. Once located, birch stands were cruised (inventory) and cull plots were established.

Total birch volumes for the Whitecourt and Slave Lake areas were estimated using a combination of cruise compilation data, deciduous-enhanced forest cover maps (where possible), and local experience.

Total birch volumes for the Whitecourt area and Slave Lake area (80 km radius) were conservatively estimated to be 59,737 m^3 and 64,500 m^3 respectively. Total birch lumber volumes were estimated to be 4.8 million fbm and 5.2 million fbm, and total clear volumes were estimated at 477,900 fbm and 516,000 fbm for the Whitecourt and Slave Lake areas respectively. Logging and milling costs were estimated to vary from \$77.50 to \$85.00/m^3 (\$387.50 to \$425.00/Mfbm).

At present, the provincial Phase III inventory including forest cover type maps is of limited use in identifying birch stands. However from the limited reconnaissance undertaken, it appears that birch suitable for conversion to lumber is scarce. The recovery of clear lumber is only a small percentage of the total lumber potential.

It is recommended that Jasper Millworks not invest excessively in birch until a provincial inventory and AAC can confirm substantial sustainable supplies.

2.0 INTRODUCTION

2.1 BACKGROUND

Jasper Millworks has been trying to purchase rough birch lumber to use in the production of finished specialty items. Supply has been a problem.

In view of this, Woodland Resource Services undertook an assessment of the feasibility of logging and sawing birch in

northern Alberta and hauling it to Edmonton for drying and finishing. A pilot project was set up in Chateh (Assumption) (see Appendix I). The aim was to cut and saw 50-75 m^3 (10,000-15,000 fbm) of birch located in a commercial stand of spruce. The resulting birch lumber was to be hauled to Edmonton for finishing. The objectives were to assess the logging, sawing and hauling costs incurred in harvesting this stand (Phase I); and to assess the product potential of the lumber which was dried and planed in Edmonton (Phase II).

However, due to severe cull problems in the Chateh birch stands (90% of the trees had rot level which precluded any lumber recovery) the pilot project was scaled down and only 7.4 m^3 (1475 fbm) were logged and sawn. This rough lumber was not hauled to Edmonton.

The problem encountered in this pilot project illustrated the necessity for careful cull assessment prior to logging. Results obtained in this study included green lumber weight, birch logging costs, and other estimated costs for sawing and hauling. Due to the long haul and high rot levels at Chateh, the assessment was relocated to the Whitecourt and Slave Lake areas.

2.2 OBJECTIVES

The objectives of the relocated study based on Chateh were to estimate the Whitecourt and Slave Lake birch log and lumber supply including a review of log quality and lumber quality potential.

3.0 WORK COMPLETED

One difficulty encountered in carrying out a birch resource inventory survey is the lack of species differentiation among deciduous cover types on the Phase III Alberta Forest Service (AFS) inventory maps. As a result, many stands that contain, or consist entirely of birch are classified as aspen types. This problem is partially overcome in the Slave Lake Forest where, due to the recent increase in demand for aspen, a number of Phase II cover type maps have been updated to show species differentiation within deciduous cover types (deciduous enhancement). Unfortunately the deciduous enhancement is still very new and very few maps have been upgraded.

Due to the lack of upgraded forest cover maps to aid in identifying birch stands, alternative methods to locate birch stands were employed (eg. discussions with locals). Budget constraints necessitated a less-than thorough job.

Consequently findings presented are very approximate and reasonably conservative.

3.1 WHITECOURT FOREST

To begin locating areas containing birch, AFS Forest Officers were contacted. Forest Officers from the Whitecourt Forest Regional Office, the Whitecourt District Office and the Fort Assiniboine District Office were consulted. Maps were purchased.

To obtain more information regarding possible sources of birch logs or lumber, a telephone survey of Whitecourt Commercial Timber Permit (CTP) holders was made.

A brief survey of one location recommended by AFS personnel was conducted. At Pass Creek (see Appendix II for map location), standard AFS cruise (inventory) plots and cull plots were established.

The birch cutting areas of two local logging contractors (see Appendix II for map location), and the logged birch were observed and photographed. The resulting birch lumber was viewed and photographed at a local small sawmill. Logging methods and costs, and birch supply were discussed.

3.2 SLAVE LAKE FOREST

Locations of potential birch stands were determined through discussions with Forest Officers from the Slave Lake Forest Regional Headquarters, and from the Kinuso, Slave Lake and Smith District Offices (ranger stations). Maps were purchased.

A local logger and sawmill owner was visited and birch locations and sawing costs were discussed.

Two promising birch areas along the Marten Hills Road (see Appendix III for map locations) were surveyed. Standard AFS cruise plots were completed. Cull plots and relascope readings were also completed. The two areas were: an old Weldwood aspen cutblock (logged last winter) containing birch and poplar residuals; and a mixed stand located along the Home Oil Trail containing a major birch component.

3.3 FIREWOOD

A brief survey of local (Edmonton area) firewood operators was made. Prices for split birch firewood (they sell) and for birch logs (they buy), and birch supply were discussed.

3.4 ANALYSIS

Following the field survey, cruise plot data were compiled for each of the three locations (Pass Creek, the aspen cutblock and the Home Oil Trail). Relascope readings and percent sawlogs were determined for the two locations along the Marten Hills Road (the aspen cutblock and the Home Oil Trail). Cull plots were summarized and averaged for the three sites (eight plots total). Total birch volumes for the Whitecourt and the Slave Lake areas were estimated using a combination of Forest Cover Type maps, local knowledge and cruise compilation data. Total clear, recoverable, birch lumber volumes for the two areas were estimated using the total birch volumes, percent sawlogs averages, and percent clear lumber recovery figures (local Whitecourt experience).

Finally cost estimates for logging, hauling and sawing were determined.

4.0 FINDINGS

4.1 WHITECOURT FOREST

The Forest Officers in Whitecourt feel that birch volumes are rather low in this forest, and that most birch areas are only suitable for firewood. Areas within townships 58-10, 57-10 are reserved for local firewood permits. However, Pass Creek was recommended as a possible birch sawlog location.

At the Pass Creek site, the majority of the trees were not of sawlog size. The trees were generally cull-free and the stand showed vigorous growth. Average birch volume was 47 m^3/ha (see Appendix IV for cruise compilation results).

FIGURES 2 and 3 illustrate the type of birch logs that were selectively logged by two local logging contractors. They had cut 154 trees from 2.4 ha (6 acres) and they estimated that they were getting 59 m^3/ha (10 cords/acre) total birch volume. Only 40% of this total volume is suitable for lumber. The other 60% consists of rotten wood, crooked and small wood (firewood size).

They also estimated that an average of 10% of the lumber is clear. (see FIGURE 4).

FIGURE 1: Birch Selective Logging Area

FIGURE 2: Local Logging Contractor's Birch Logs

FIGURE 3: Local Logging Contractor's Birch Logs

FIGURE 4: Clear Birch Lumber (marked with arrow)

The area in which they are now cutting, shown in FIGURE 1, is approximately 405 ha (1000 acres). At 59 m^3/ha total volume, this amounts to 9558 m^3 or 23.6 m^3/ha which would be suitable for sawing. Using an LRF of 200 fbm/m^3, the lumber potential is 1.91 million fbm.

The contractors estimate that within economical distance of Whitecourt (a radius of about 80 km) there are 5 similar areas. Thus the Whitecourt area would have approximately 47,790 m^3 of birch sawlogs (9.558 million fbm lumber) and 955,800 fbm clear lumber based on these estimates.

Costs for selective logging as reported by experienced contractors, were generally about 3 times more than for conventional (clear cut) logging.

FIGURES 5 and 6 illustrate the type of birch lumber produced by the small Whitecourt sawmill.

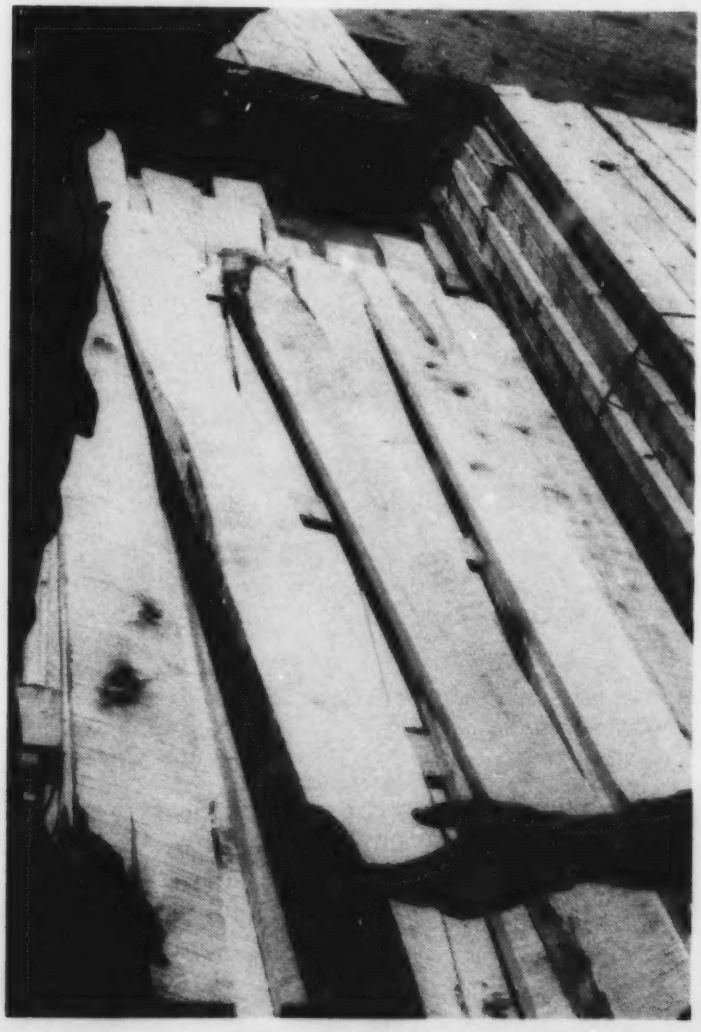


FIGURE 5: Birch Lumber Produced at Whitecourt Sawmill

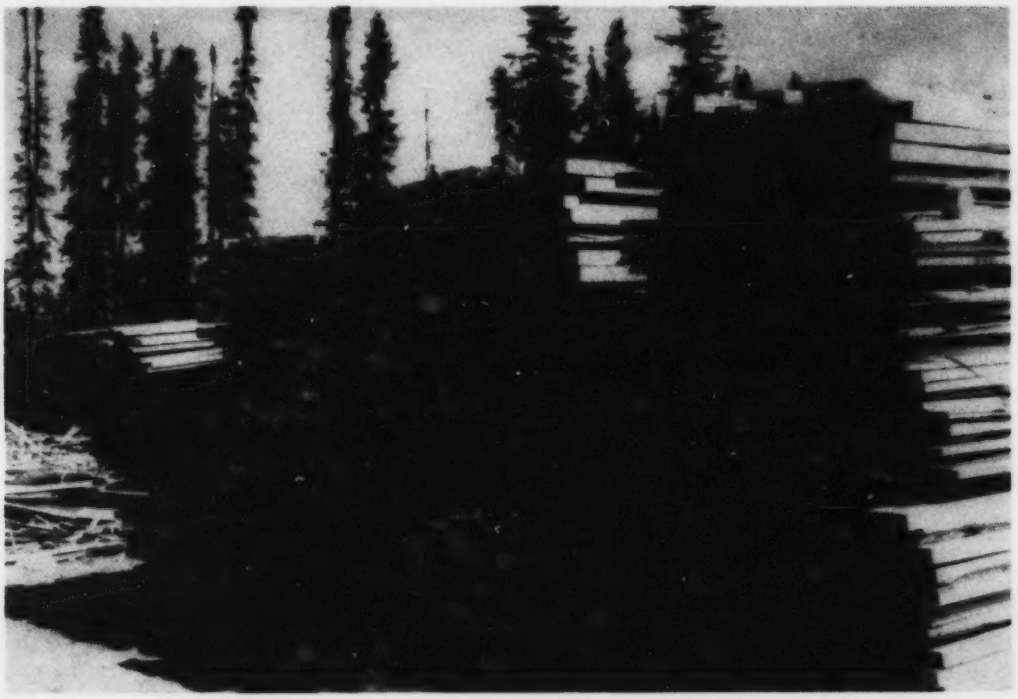


FIGURE 6: Birch Lumber Produced at Whitecourt Sawmill

4.2 SLAVE LAKE FOREST

Birch supply, especially in terms of size and quality, appeared to be better in the Slave Lake area. The Marten Hills Road region was recommended by a number of AFS and local people as having good potential for sawlog size birch. Therefore, two sites were surveyed along this road.

4.2.1 ASPEN CUTBLOCK

This cutblock, harvested for aspen by Weldwood in the past winter, has approximately 40 ha of residual birch. There was an average of 92 m^3/ha (see Appendix V) and 471 trees/ha.

Stems were basically straight, rot was low (<15%) and stain varied from 2-28% (see Appendix IV for cull compilation). However, it must be pointed out that because this birch is residual in a logged area, cull will probably increase rapidly over the next few years. While it is possible to salvage birch that had been knocked down during aspen logging, decay will be severe next year.

FIGURES 7, 8 and 9 illustrate the type of cull and a view of the area.

FIGURE 7: Aspen Cutblock (Marten Hills Road)-Cull Plot

FIGURE 8: Aspen Cutblock (Marten Hills Road)-Cull Plot

4.2.2 HOME OIL TRAIL

Of the areas studied, this area had the best mixedwood stand containing volumes of continuous birch. The stand was approximately 45 ha, contained an average of 123 m^3/ha and 782 trees/ha (see Appendix V).

FIGURE 9: View of Aspen Cutblock (Marten Hills Road)

The overall quality was good, although the south end of the block had more signs of cull. Rot was low (at most, 23%) and stain ranged from 0-50%. Stems were basically straight and average diameter at breast height (DBH) was 22.4 cm.

FIGURES 10 to 13 illustrate the types of cull observed and the a view of the area.

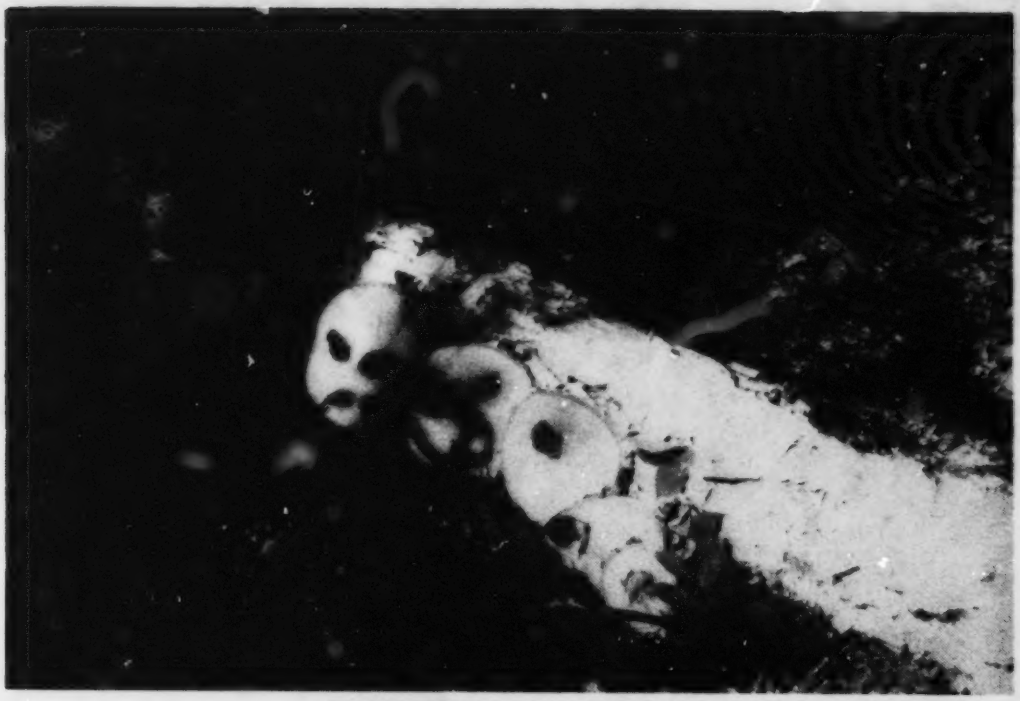


FIGURE 10:
Home Oil Birch Stand (Marten Hills Road)- Cull Plot

FIGURE 11:
Home Oil Birch Stand (Marten Hills Road)- Cull Plot

FIGURE 12:
View of Home Oil Birch Stand (Marten Hills Road)

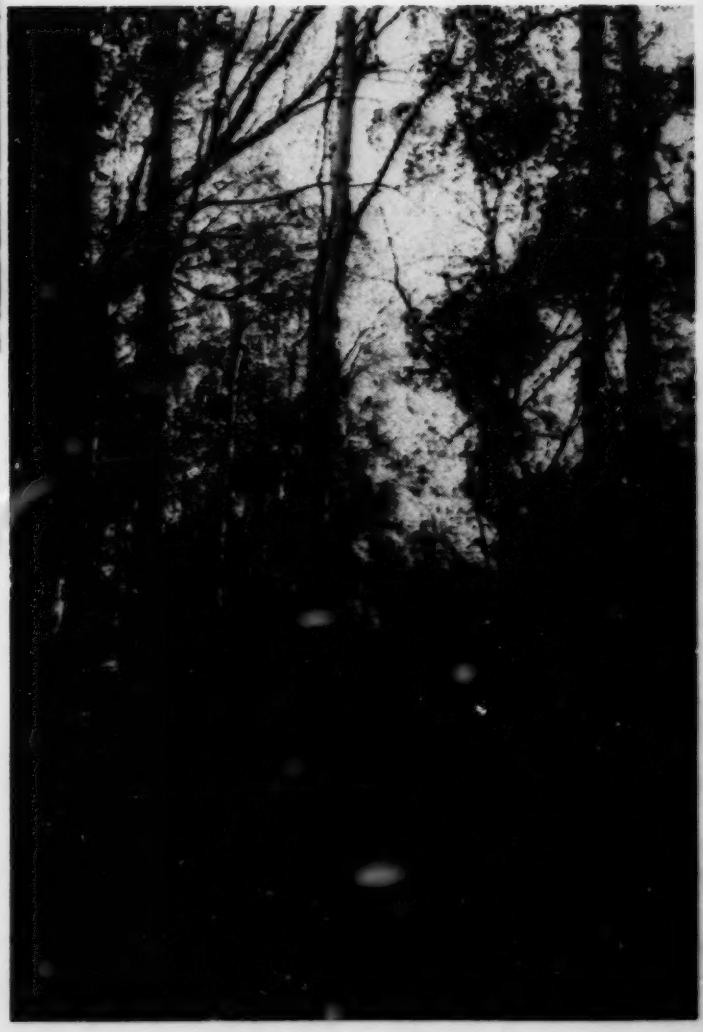


FIGURE 13:
View of Home Oil Birch Stand (Marten Hills Road)

4.3 TOTAL VOLUMES BY AREA

4.3.1 WHITECOURT AREA

59,737 m^3 total birch volume*
4.779 million fbm lumber
477,900 fbm clear lumber

4.3.2 SLAVE LAKE AREA

64,500 m^3 total birch volume**
5.16 million fbm lumber
516,000 fbm clear lumber

* 5 areas with 59 m^3/ha reduced by 50% (as this figure has not been field verified)

** 600 ha with 107.5 m^3/ha (300 ha of birch types observed on one deciduous-enhanced cover type map times 2 for area and the average of 2 sites surveyed)

4.4 ACCESS

4.4.1 WHITECOURT

The access to the Whitecourt birch areas was not determined. Could have discussed with AFS peronnel.

4.4.2 SLAVE LAKE

There is good access to the Marten Hills Road sites, particularly the old aspen cutblock. At present, the best access is north from the town of Slave Lake on highway 67 10 km to the Marten Hills Road turnoff and west on this road to the sites. See Appendix V for detailed present and alternative access information.

4.5 FIREWOOD

Generally only 40% of the birch volume found in the stands inspected was of sawlog quality. That is, they were straight, free of cull and had a DBH of 19cm+. With careful bucking and sawing of cull-free logs, it would be possible to produce lumber from trees of smaller diameters (down to 10cm).

Smaller trees, instead of being wasted, could be used for firewood. The operator could either buck and split the wood himself, or the logs could be sold to local firewood operators. Bulk firewood, split and delivered in Edmonton sells for about $175/cord, unsplit $155/cord. A local firewood operator would buy, for example, 10cm, 3m logs for $33/m^3 delivered (close to Edmonton).

This same local firewood operator said that he often cut sawlog size birch logs which he would be willing to sell.

4.6 LOGGING COSTS

Logging and milling cost estimates below are based on Woodlands staff experience gained from estimating logging costs for contractors and mill operators. Actual costs reported to us during project interviews were suspected as being incomplete.

	$/m3	$/Mfbm
Dues reforestation and overhead	2.50	12.50
Falling, skidding and decking	20.00	100.00
Landings and decking	1.00	5.00
Loading logs	2.00	10.00
Hauling logs to mill (up to 80km)	13.00	65.00
Unloading and decking	1.00	5.00
Sawing	20.00	100.00
Truck air dried lumber		
from Whitecourt	18.00	90.00
from Slave Lake	25.50	127.50
TOTALS	$77.50 to $85.00	$387.50 to $425.00

Costs to handle small logs as firewood are estimated to be:

Cost of logs in yard from above	$39.50m^3
Cost to haul to Edmonton	
from Whitecourt	9.00/m^3
from Slave Lake	12.00/m^3
TOTAL	$58.50/m^3 to $61.50/m^3

($142.00/cord to $149.00/cord)

4.7 DRYING AND FINISHING OF BIRCH LUMBER

In order to get a feel for the drying and finishing characteristics a truck load of birch lumber was purchased from a Whitecourt area sawmill and hauled to Jasper Millworks west end yard in Edmonton. This lumber was air dried then planed. A representative bundle (about 1500 board feet) was examined by Mr. Albert Smith and the percentage of clear lumber estimated.

Based on examinations of birch sawlogs in the forest and in mill yards by Jim Pearson and Laura Cottle, the sample graded by Mr. Smith is rated as average for birch lumber. The sample was not the best possible nor the worst. The clear lumber estimates made by Mr. Smith are listed and summarized in TABLES 1 to 4.

Of the 1542 fbm sample 394 fbm could be recovered as clear lumber by resawing or cutting out defects. This estimate does not contain an allowance for trim losses if bucking is restricted to fixed lengths for a particular product. Recovery of clear lumber is about 25%.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

1. Interest in birch for firewood and lumber may warrant increased provincial attention in terms of inventory and sustained yield management. We recommend that "FORESTRY, LANDS AND WILDLIFE" undertake a birch inventory, AAC calculation on a provincial forest as a pilot project.

2. Birch suitable for conversion to lumber is limited. Birch suitable for conversion to clear lumber is only a small percentage of the total lumber potential (477,900 fbm and 516,000 fbm clear were identified in the Whitecourt and Slave Lake forests respectively).

3. Cost estimates for logging and converting birch to lumber and delivery to Edmonton are estimated at $387 to $425 per Mfbm. Residual firewood could be brought into Edmonton at about $136 to $143/cord and sold at a cost recovery price of $155/cord.

   Alternately, birch lumber could be bought from small sawmillers at about $400 to 450 per Mfbm to cover their costs plus a risk and profit mark-up.

TABLE 1

VOLUME OF CLEAR, BIRCH LUMBER AFTER DRYING AND FINISHING

PIECE SIZE	PIECE VOLUME	DESCRIPTION OF PIECE	% CLEAR	CLEAR VOLUME	TOTAL VOLUME
2X4X16	10.7	CROOKED BIG KNOT	0	0.00	10.7
2X4X16	10.7	CROOKED BIG KNOT	0	0.00	10.7
2X4X16	10.7	CROOKED BIG KNOT	0	0.00	10.7
2X4X16	10.7	CROOKED BIG KNOT	0	0.00	10.7
2X4X16	10.7	CROOKED BIG KNOT	0	0.00	10.7
2X6X16	16.0	HEART ROT	0	0.00	16.0
2X6X16	16.0	CROOK ROT	0	0.00	16.0
2X8X16	21.3	KNOT HEART ROT	0	0.00	21.3
2X8X16	21.3	KNOT HEART ROT	0	0.00	21.3
2X6X16	16.0	HEART ROT	0	0.00	16.0
2X6X16	16.0	CLEAR	100	16.00	16.0
2X6X16	16.0	HEART ROT	0	0.00	16.0
2X6X16	16.0	HEART ROT	0	0.00	16.0
2X4X16	10.7	CLEAR	100	10.70	10.7
2X8X16	21.3	SOME CLEAR	80	17.04	21.3
2X6X16	16.0	CLEAR HEART ROT	70	11.20	16.0
2X4X16	10.7	CLEAR WANE HEART ROT	60	6.42	10.7
2X4X16	10.7	CLEAR WANE HEART ROT	60	6.42	10.7
2X6X16	16.0	CLEAR HEART ROT	20	3.20	16.0
2X6X16	16.0	HEART ROT	0	0.00	16.0
2X10X16	26.7	HEART ROT CLEAR	60	16.02	26.7
2X6X16	16.0	CLEAR CROOKED	100	16.00	16.0
2X6X16	16.0	CLEAR	100	16.00	16.0
2X6X16	16.0	CLEAR	100	16.00	16.0
2X10X16	26.7	CLEAR SHAKE	100	26.70	26.7
2X4X16	10.7	BIG KNOT CROOK	0	0.00	10.7
2X6X16	16.0	HEART STAIN	0	0.00	16.0
2X4X16	10.7	CROOK STAIN	0	0.00	10.7
2X10X16	26.7	STAIN	0	0.00	26.7
2X8X16	21.3	STAIN	0	0.00	21.3
2X8X16	21.3	HEART SEPARATION BLACK KNOT	0	0.00	21.3
2X4X16	10.7	HEART STAIN BLACK KNOT	0	0.00	10.7
2X6X16	16.0	CLEAR	100	16.00	16.0
2X8X16	21.3	WIND CHECK	0	0.00	21.3
2X6X16	16.0	CLEAR	70	11.20	16.0
2X6X16	16.0	CLEAR WANE	100	16.00	16.0
2X8X16	21.3	CULL	0	0.00	21.3
2X6X16	16.0	CLEAR	50	8.00	16.0
2X6X16	16.0	CLEAR	100	16.00	16.0
2X4X16	10.7	CULL	0	0.00	10.7
2X4X16	10.7	CULL	0	0.00	10.7
2X4X16	10.7	CULL	0	0.00	10.7
2X6X16	16.0	CULL	0	0.00	16.0
2X4X16	10.7	KNOTS CLEAR	20	2.14	10.7
2X6X16	16.0	CULL	0	0.00	16.0
TOTAL				231.04	709.7
AVERAGE			30.89	5.13	15.77

TABLE 2

VOLUME OF CLEAR, BIRCH LUMBER AFTER DRYING AND FINISHING

PIECE SIZE	PIECE VOLUME	DESCRIPTION OF PIECE	% CLEAR	CLEAR VOLUME	TOTAL VOLUME
2X6X16	16.0	SPIKE KNOT HEART STAIN	0	0.00	16.0
2X4X16	10.7	SPIKE KNOT	0	0.00	10.7
2X4X16	10.7	CLEAR	60	6.42	10.7
2X4X16	10.7	CULL	0	0.00	10.7
2X4X16	10.7	HEART STAIN	0	0.00	10.7
2X4X16	10.7	CROOKED KNOTS	0	0.00	10.7
2X4X16	10.7	CLEAR	70	7.49	10.7
2X4X16	10.7	CULL	0	0.00	10.7
2X8X16	21.3	HEART STAIN SPIKE KNOTS	0	0.00	21.3
2X6X16	16.0	CLEAR	60	9.60	16.0
2X4X16	10.7	CLEAR WANE	40	4.28	10.7
2X6X16	16.0	CLEAR ROT KNOTS	20	3.20	16.0
2X4X16	10.7	CLEAR BAD SAWING	80	8.56	10.7
2X6X16	16.0	SPIKE KNOTS	10	1.60	16.0
2X6X16	16.0	HEART STAIN	30	4.80	16.0
2X4X16	10.7	CULL	0	0.00	10.7
2X6X16	16.0	CULL	0	0.00	16.0
2X6X16	16.0	CLEAR	60	9.60	16.0
2X8X16	21.3	HEART SHAKE KNOTS	20	4.26	21.3
2X4X16	10.7	CULL	0	0.00	10.7
2X6X16	16.0	CLEAR	80	12.80	16.0
2X4X16	10.7	CULL	0	0.00	10.7
2X6X16	16.0	CULL	0	0.00	16.0
2X4X16	10.7	CULL	0	0.00	10.7
2X6X16	16.0	CULL	0	0.00	16.0
2X6X16	16.0	CLEAR	80	12.80	16.0
2X10X16	26.7	HEART CHECK ROT	10	2.67	26.7
2X4X16	10.7	KNOTS HEART ROT	0	0.00	10.7
2X6X16	16.0	HEART SEPARATION	0	0.00	16.0
2X4X16	10.7	CLEAR	60	6.42	10.7
2X6X16	16.0	CULL	0	0.00	16.0
2X4X16	10.7	SPIKE KNOTS	10	1.07	10.7
2X10X16	26.7	CLEAR HEART CRACK ROT	50	13.35	26.7
2X6X16	16.0	CULL	0	0.00	16.0
2X4X16	10.7	CULL	0	0.00	10.7
2X4X16	10.7	CEAR	60	6.42	10.7
2X4X16	10.7	CULL	0	0.00	10.7
2X4X16	10.7	CULL	0	0.00	10.7
2X4X16	10.7	CULL	0	0.00	10.7
2X6X16	16.0	CLEAR	20	3.20	16.0
2X4X16	10.7	CULL	0	0.00	10.7
2X6X16	16.0	CLEAR	80	12.80	16.0
2X8X16	21.3	CULL	0	0.00	21.3
2X6X16	16.0	CULL	0	0.00	16.0
2X4X16	10.7	CULL	0	0.00	10.7
TOTAL				131.34	635.4
AVERAGE			20.00	2.92	14.12

TABLE 3

VOLUME OF CLEAR, BIRCH LUMBER AFTER DRYING AND FINISHING

PIECE SIZE	PIECE VOLUME	DESCRIPTION OF PIECE	% CLEAR	CLEAR VOLUME	TOTAL VOLUME
2X8X16	21.3	CLEAR HEART ROT	20	4.26	21.3
2X6X16	16.0	CULL	0	0.00	16.0
2X4X16	10.7	SPIKE KNOT	0	0.00	10.7
2X4X16	10.7	WANE CLEAR	10	1.07	10.7
2X6X16.	16.0	CLEAR	20	3.20	16.0
2X6X16	16.0	CLEAR	40	6.40	16.0
2X4X16	10.7	CLEAR	40	4.28	10.7
2X4X16	10.7	CULL	0	0.00	10.7
2X4X16	10.7	CULL	0	0.00	10.7
2X6X16	16.0	CLEAR	60	9.60	16.0
2X8X16	21.3	CULL	0	0.00	21.3
2X6X16	16.0	CLEAR	20	3.20	16.0
2X4X16	10.7	CULL	0	0.00	10.7
2X4X16	10.7	CULL	0	0.00	10.7
TOTAL				32.01	197.5
AVERAGE			15.00	2.29	14.11

TABLE 4

VOLUME OF CLEAR, BIRCH LUMBER AFTER DRYING AND FINISHING

PIECE SIZE	PIECE VOLUME	DESCRIPTION OF PIECE	% CLEAR	CLEAR VOLUME	TOTAL VOLUME
TOTAL	PAGE1			231.04	709.7
AVERAGE	PAGE1		30.89	5.13	15.77
TOTAL	PAGE2			131.34	635.4
AVERAGE	PAGE2		20.00	2.92	14.12
TOTAL	PAGE3			32.01	197.5
AVERAGE	PAGE3		15.00	2.29	14.11
GRAND TOTAL				394.39	1542.6
			25.57	3.79	14.83

Due to the small supply of birch available, most small sawmillers only handle birch as a sideline and as a consequence, supplies from them are sporadic and unreliable.

4. High recovery of clear, birch lumber from Alberta birch stands is a risky undertaking given current stand conditions and knowledge about them.

5. Provincial inventory information on birch stands is very sketchy (essentially limited to the personal knowledge of some field staff).

6. Birch stands of saw log size tend to contain decay and other defects.

7. Stands of a size and total volume to permit efficient large scale logging and sawing seem limited in number.

8. Recovery of the highest value lumber (clear) is limited to an average of about 25%.

9. There are supplies of birch suitable for conversion to lumber in the Slave Lake and Whitecourt Forests. The identifiable birch volumes are such that a major purchaser remanufacturing operation such as Jasper Millworks, will be unlikely to maintain an adequate supply of birch lumber. The supply that would be sustainable is difficult to assess without provincial scale inventory input.

5.2 RECOMMENDATIONS

1. Woodlands recommends that birch lumber operators requiring significant volumes of birch proceed cautiously until provincial birch inventory information is more complete.

2. Woodlands recommends that the provincial government document existing birch information and supplement birch inventory information in areas where significant areas of birch stands have been identified.

3. Woodlands recommends that Jasper Millworks not invest excessively in birch until provincial inventory and AAC calculations can confirm substantial sustainable supplies.

APPENDIX I

Pilot Stage - Chateh, Alberta

PILOT STAGE - CHATEH, ALBERTA

1.0 BACKGROUND

Jasper Millworks has been trying to purchase specialty rough lumber in order to dry it, dress it and market it.

Supply has been a problem. A pilot project was set up to run at Chateh, Alberta with approximately 35,000 fbm of birch to be logged and sawn. The birch to be logged was residual birch mixed with a commercial stand of spruce along Zama ridge. The spruce was being logged over the winter of 1986-87.

2.0 PROJECT PROBLEMS

Project problems became evident when falling of the birch began. Approximately 90% of the trees in the cut block selected had top rot serious enough to preclude any lumber recovery (see FIGURES A1 to A3).

A small volume of logs were bucked in the bush, carried to roadside and sawed into one inch boards using an Alaskan Mill and a shop table saw.

3.0 FINDINGS

Actual cost to log and saw 1475 fbm	= $4,500.
(labour only)	= $3,050./fbm
Estimated cost to log to roadside based on cull of 25% or less (if logging done in conjunction with conifer logging)	= $ 75./Mfbm
Estimated cost to saw at roadside	= $ 125./Mfbm
Cat costs for preparation and clean up	= $ 10./Mfbm
Handling and loading costs	= $ 20./Mfbm
Estimated cost to haul to Edmonton (tractor and highboy @ $65./hour; Payload of 20,000 kg or 8,400 fbm @ *2.39 kg/fbm rough green weight and a loaded backhaul speed of 90 kmph over 1,000 km)	= $ 86./Mfbm**

* Actual weight of a small sample of rough, green, cull measure, sawn, birch lumber

** About $160./Mfbm if not on a backhaul = $ 299.

4.0 RECOMMENDATIONS

Proceed with a birch inventory cull assessment to identify birch stands suitable for lumber with tolerable amounts of decay.

FIGURE A1

FIGURES A1 to A3 - Residual birch trees showing broken tops indicating excessive decay levels.

FIGURE A2

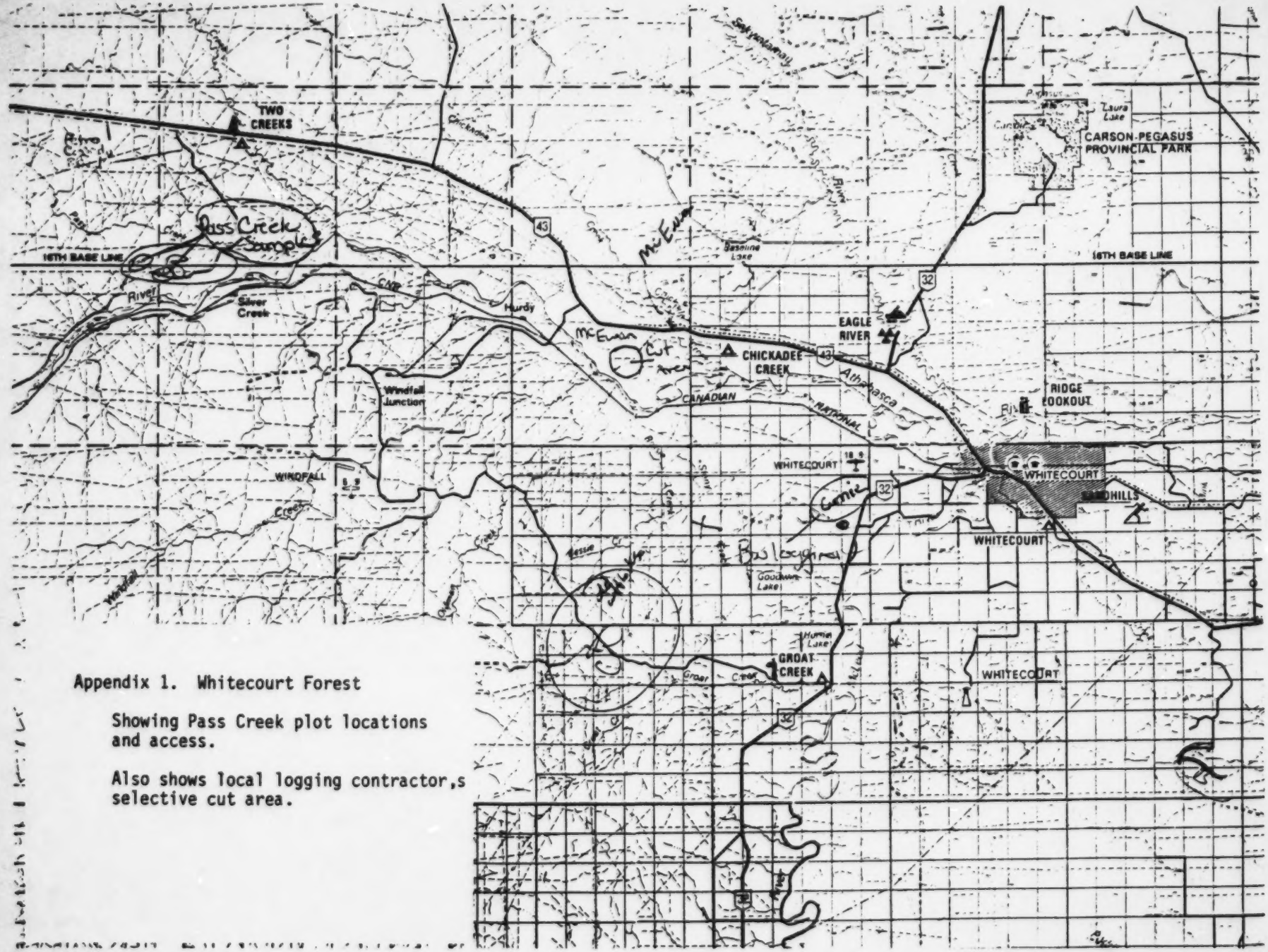
FIGURES A1 to A3 - Residual birch trees showing broken tops indicating excessive decay levels.

FIGURE A3

FIGURES A1 to A3 - Residual birch trees showing broken tops indicating excessive decay levels.

APPENDIX II

Map for Whitecourt



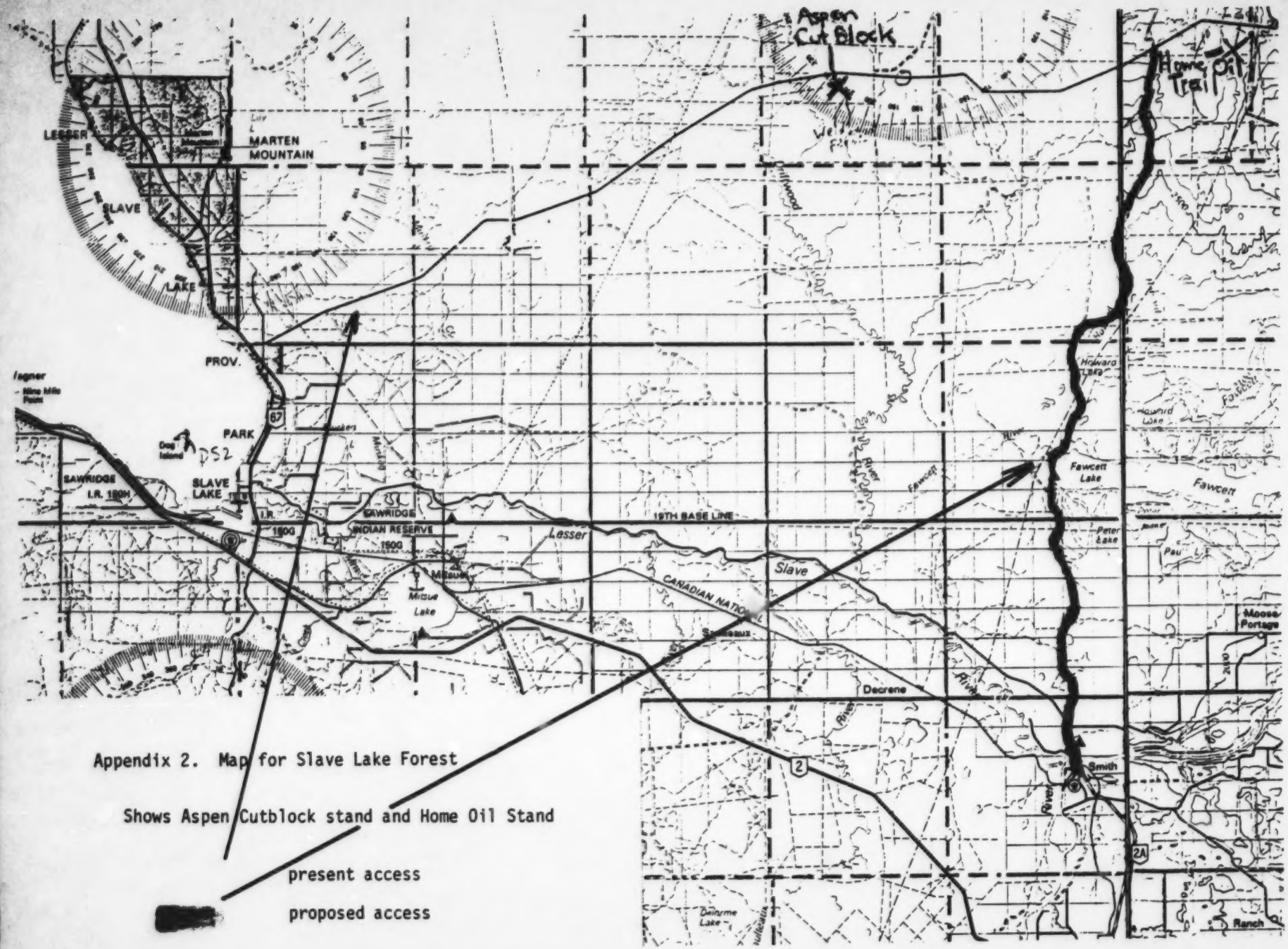
Appendix 1. Whitecourt Forest

Showing Pass Creek plot locations and access.

Also shows local logging contractor,s selective cut area.

APPENDIX III

Map for Slave Lake



Appendix 2. Map for Slave Lake Forest

Shows Aspen Cutblock stand and Home Oil Stand

present access

proposed access

APPENDIX IV

Birch Cruise Compilations

WHITECOURT/SLAVE LAKE BIRCH STUDY

CULL PLOT COMPILATION

WHITECOURT FOREST

Tree 1 - Pass Creek

Log	Average Diam.-cm	Log Length-m	Basal Area-m2	Percent Rot	Percent Stain	Volume Log	Rot Volume	Stain Volume
1	21.30	2.60	0.036	0.0	0.0	0.093	0.000	0.00
2	15.80	2.60	0.020	0.0	0.0	0.051	0.000	0.00
3	12.30	2.60	0.012	0.0	0.0	0.031	0.000	0.00
TOTAL TREE			0.07			0.174		

Clear Wood: 0.174 m3

SLAVE LAKE FOREST

Tree 2 - Marten Hills Road-Aspen Cut Area

Log	Average Diam.-cm	Log Length-m	Basal Area-m2	Percent Rot	Percent Stain	Volume Log	Rot Volume	Stain Volume
1	23.90	2.60	0.045	0.0	2.5	0.117	0.000	0.003
2	21.20	2.60	0.035	0.0	5.0	0.092	0.000	0.005
3	19.40	2.60	0.030	0.0	4.0	0.077	0.000	0.003
4	16.90	2.60	0.022	0.0	2.5	0.058	0.000	0.001
5	12.90	3.60	0.013	0.0	2.5	0.047	0.000	0.001
TOTAL TREE			0.145		3.3	0.390		0.013

Clear Wood: 0.377 m3

PASS CREEK CRUISE COMPILATION

STAND TABLE FOR STRATUM: SUMMARY

NUMBER OF TREES PER HECTARE BY DBH (CM.) AND SPECIES

DIAMETER CLASS	AW	BW	PB	TOT.	%
6.01 - 8.00	0.	1043.	0.	1043.	44.
8.01 - 10.00	141.	0.	0.	141.	6.
10.01 - 12.00	102.	309.	88.	499.	21.
12.01 - 14.00	151.	83.	0.	234.	10.
14.01 - 16.00	0.	173.	0.	173.	7.
16.01 - 18.00	80.	0.	0.	80.	3.
18.01 - 20.00	38.	38.	0.	77.	3.
20.01 - 22.00	86.	0.	0.	86.	4.
22.01 - 24.00	0.	0.	0.	0.	0.
24.01 - 26.00	21.	0.	0.	21.	1.
26.01 - 28.00	0.	0.	0.	0.	0.
TOTAL	619.	1646.	88.	2354.	100.
PERCENT	26.	70.	4.	100.	

SUMMARY STATISTICS

MEAN :	2353.55	TREES/HA.
CONFIDENCE INTERVAL (+/-):	2357.83	TREES/HA.
PROBABILITY (%):	90.00	
STANDARD ERROR (%):	53.12	
TOTAL STEMS:	47070.97	
TOTAL AREA:	20.00	HA.
DEGREES OF FREEDOM:	2	
NUMBER OF STRATA:	1	
MIN. DBH.:	1.00	CM.
MIN. HEIGHT:	1.00	M.
MIN. TOP DIAM:	4.00	CM.
AVERAGE DBH / TREE:	10.60	CM.
AVERAGE HT / TREE :	11.04	M.

APPENDIX IV CONTINUED

'ASPEN 'CUT 'BLOCK' CRUISE COMPILATION

'STOCK 'TABLE FOR STRATUM: SUMMARY

VOLUME-(CU.-M.) PER HECTARE BY DBH (CM.) AND SPECIES

DIAMETER CLASS	SW	PL	'BW'	PB	TOT.	%
8.01 - 10.00	1.31	.00	.00	.00	1.31	.82
10.01 - 12.00	.00	.00	.00	.00	.00	.00
12.01 - 14.00	.00	.00	5.42	.00	5.42	3.41
14.01 - 16.00	.00	.00	2.32	.00	2.32	1.46
16.01 - 18.00	.00	.00	16.78	.00	16.78	10.56
18.01 - 20.00	.00	.00	11.01	4.98	15.98	10.06
20.01 - 22.00	.00	.00	15.03	4.66	19.69	12.39
22.01 - 24.00	.00	.00	17.06	.00	17.06	10.74
24.01 - 26.00	.00	.00	12.43	.00	12.43	7.83
26.01 - 28.00	6.00	.00	3.98	5.02	14.99	9.44
28.01 - 30.00	.00	.00	3.64	.00	3.64	2.29
30.01 - 32.00	.00	.00	4.31	.00	4.31	2.72
32.01 - 34.00	6.57	.00	.00	4.99	11.56	7.28
34.01 - 36.00	.00	.00	.00	12.06	12.06	7.59
36.01 - 38.00	.00	.00	.00	4.57	4.57	2.88
38.01 - 40.00	.00	6.07	.00	.00	6.07	3.82
40.01 - 42.00	.00	.00	.00	5.97	5.97	3.76
42.01 - 44.00	.00	.00	.00	.00	.00	.00
44.01 - 46.00	.00	.00	.00	.00	.00	.00
46.01 - 48.00	.00	.00	.00	.00	.00	.00
48.01 - 50.00	.00	.00	.00	.00	.00	.00
50.01 - 52.00	.00	.00	.00	.00	.00	.00
52.01 - 54.00	.00	.00	.00	.00	.00	.00
54.01 - 56.00	.00	.00	.00	.00	.00	.00
56.01 - 58.00	.00	.00	.00	.00	.00	.00
58.01 - 60.00	.00	.00	.00	.00	.00	.00
60.01 - 62.00	.00	.00	.00	.00	.00	.00
62.01 - 64.00	.00	.00	.00	.00	.00	.00
64.01 - 66.00	.00	.00	.00	.00	.00	.00
66.01 - 68.00	.00	.00	.00	4.69	4.69	2.95
68.01 - 70.00	.00	.00	.00	.00	.00	.00
TOTAL	13.88	6.07	91.98	46.93	158.85	100.00
PERCENT	8.74	3.82	57.90	29.54	100.00	

APPENDIX IV CONTINUED

ASPEN CUT BLOCK CRUISE COMPILATION

STAND TABLE FOR STRATUM: SUMMARY

NUMBER OF TREES PER HECTARE BY DBH (CM.) AND SPECIES

DIAMETER CLASS	SW	PL	BW	PB	TOT.	%
8.01 - 10.00	83.	0.	0.	0.	83.	13.
10.01 - 12.00	0.	0.	0.	0.	0.	0.
12.01 - 14.00	0.	0.	83.	0.	83.	13.
14.01 - 16.00	0.	0.	32.	0.	32.	5.
16.01 - 18.00	0.	0.	101.	0.	101.	15.
18.01 - 20.00	0.	0.	65.	23.	88.	13.
20.01 - 22.00	0.	0.	68.	18.	87.	13.
22.01 - 24.00	0.	0.	57.	0.	57.	9.
24.01 - 26.00	0.	0.	37.	0.	37.	6.
26.01 - 28.00	11.	0.	11.	11.	33.	5.
28.01 - 30.00	0.	0.	9.	0.	9.	1.
30.01 - 32.00	0.	0.	8.	0.	8.	1.
32.01 - 34.00	7.	0.	0.	7.	15.	2.
34.01 - 36.00	0.	0.	0.	13.	13.	2.
36.01 - 38.00	0.	0.	0.	6.	6.	1.
38.01 - 40.00	0.	5.	0.	0.	5.	1.
40.01 - 42.00	0.	0.	0.	5.	5.	1.
42.01 - 44.00	0.	0.	0.	0.	0.	0.
44.01 - 46.00	0.	0.	0.	0.	0.	0.
46.01 - 48.00	0.	0.	0.	0.	0.	0.
48.01 - 50.00	0.	0.	0.	0.	0.	0.
50.01 - 52.00	0.	0.	0.	0.	0.	0.
52.01 - 54.00	0.	0.	0.	0.	0.	0.
54.01 - 56.00	0.	0.	0.	0.	0.	0.
56.01 - 58.00	0.	0.	0.	0.	0.	0.
58.01 - 60.00	0.	0.	0.	0.	0.	0.
60.01 - 62.00	0.	0.	0.	0.	0.	0.
62.01 - 64.00	0.	0.	0.	0.	0.	0.
64.01 - 66.00	0.	0.	0.	0.	0.	0.
66.01 - 68.00	0.	0.	0.	2.	2.	0.
68.01 - 70.00	0.	0.	0.	0.	0.	0.
TOTAL	101.	5.	471.	84.	662.	100.
PERCENT	15.	1.	71.	13.	100.	

APPENDIX IV CONTINUED

HOMEOIL TRAIL CRUISE COMPILATION

'STOCK TABLE' FOR STRATUM: SUMMARY

VOLUME (CU. M.) PER HECTARE BY DBH (CM.) AND SPECIES

DIAMETER CLASS	SW	PL	BW	TOT.	%
8.01 - 10.00	.00	.00	2.26	2.26	1.22
10.01 - 12.00	.00	.00	.00	.00	.00
12.01 - 14.00	.00	.00	9.30	9.30	5.00
14.01 - 16.00	.00	.00	13.74	13.74	7.39
16.01 - 18.00	.00	.00	15.14	15.14	8.14
18.01 - 20.00	.00	.00	25.89	25.89	13.92
20.01 - 22.00	.00	.00	14.65	14.65	7.87
22.01 - 24.00	.00	.00	22.13	22.13	11.90
24.01 - 26.00	6.49	.00	7.75	14.24	7.66
26.01 - 28.00	.00	.00	.00	.00	.00
28.01 - 30.00	.00	.00	8.00	8.00	4.30
30.01 - 32.00	.00	4.31	.00	4.31	2.31
32.01 - 34.00	.00	.00	.00	.00	.00
34.01 - 36.00	.00	.00	4.32	4.32	2.32
36.01 - 38.00	.00	.00	.00	.00	.00
38.01 - 40.00	6.02	11.61	.00	17.63	9.48
40.01 - 42.00	.00	.00	.00	.00	.00
42.01 - 44.00	.00	.00	.00	.00	.00
44.01 - 46.00	.00	.00	.00	.00	.00
46.01 - 48.00	.00	.00	.00	.00	.00
48.01 - 50.00	5.58	11.76	.00	17.34	9.32
50.01 - 52.00	.00	5.18	.00	5.18	2.78
52.01 - 54.00	.00	.00	.00	.00	.00
54.01 - 56.00	.00	.00	.00	.00	.00
56.01 - 58.00	.00	.00	.00	.00	.00
58.01 - 60.00	5.01	6.89	.00	11.90	6.40
60.01 - 62.00	.00	.00	.00	.00	.00
TOTAL	23.10	39.74	123.18	186.02	100.00
PERCENT	12.42	21.36	66.22	100.00	

APPENDIX IV CONTINUED

'HOMEOIL' TRAIL CRUISE COMPILATION

STAND TABLE FOR STRATUM: SUMMARY

NUMBER OF TREES PER HECTARE BY DBH (CM.) AND SPECIES

DIAMETER CLASS	SW	PL	BW	TOT.	%
8.01 - 10.00	0.	0.	80.	80.	10.
10.01 - 12.00	0.	0.	0.	0.	0.
12.01 - 14.00	0.	0.	136.	136.	16.
14.01 - 16.00	0.	0.	140.	140.	17.
16.01 - 18.00	0.	0.	100.	100.	12.
18.01 - 20.00	0.	0.	140.	140.	17.
20.01 - 22.00	0.	0.	67.	67.	8.
22.01 - 24.00	0.	0.	71.	71.	8.
24.01 - 26.00	11.	0.	25.	36.	4.
26.01 - 28.00	0.	0.	0.	0.	0.
28.01 - 30.00	0.	0.	18.	18.	2.
30.01 - 32.00	0.	8.	0.	8.	1.
32.01 - 34.00	0.	0.	0.	0.	0.
34.01 - 36.00	0.	0.	6.	6.	1.
36.01 - 38.00	0.	0.	0.	0.	0.
38.01 - 40.00	5.	10.	0.	15.	2.
40.01 - 42.00	0.	0.	0.	0.	0.
42.01 - 44.00	0.	0.	0.	0.	0.
44.01 - 46.00	0.	0.	0.	0.	0.
46.01 - 48.00	0.	0.	0.	0.	0.
48.01 - 50.00	3.	6.	0.	9.	1.
50.01 - 52.00	0.	3.	0.	3.	0.
52.01 - 54.00	0.	0.	0.	0.	0.
54.01 - 56.00	0.	0.	0.	0.	0.
56.01 - 58.00	0.	0.	0.	0.	0.
58.01 - 60.00	2.	2.	0.	4.	1.
60.01 - 62.00	0.	0.	0.	0.	0.
TOTAL	22.	29.	782.	833.	100.
PERCENT	3.	3.	94.	100.	

APPENDIX V

Birch Cull Compilations

WHITECOURT/SLAVE LAKE BIRCH STUDY

CULL PLOT COMPILATION

WHITECOURT FOREST

Tree 1 - Pass Creek

Log	Average Diam.-cm	Log Length-m	Basal Area-m2	Percent Rot	Percent Stain	Volume Log	Rot Volume	Stain Volume
1	21.30	2.60	0.036	0.0	0.0	0.093	0.000	0.00
2	15.80	2.60	0.020	0.0	0.0	0.051	0.000	0.00
3	12.30	2.60	0.012	0.0	0.0	0.031	0.000	0.00
TOTAL TREE			0.07			0.174		

Clear Wood: 0.174 m3

SLAVE LAKE FOREST

Tree 2 - Marten Hills Road-Aspen Cut Area

Log	Average Diam.-cm	Log Length-m	Basal Area-m2	Percent Rot	Percent Stain	Volume Log	Rot Volume	Stain Volume
1	23.90	2.60	0.045	0.0	2.5	0.117	0.000	0.003
2	21.20	2.60	0.035	0.0	5.0	0.092	0.000	0.005
3	19.40	2.60	0.030	0.0	4.0	0.077	0.000	0.003
4	16.90	2.60	0.022	0.0	2.5	0.058	0.000	0.001
5	12.90	3.60	0.013	0.0	2.5	0.047	0.000	0.001
TOTAL TREE			0.145		3.3	0.390		0.013

Clear Wood: 0.377 m3

Tree 3 - Marten Hills Road-Aspen Cut Area

Log	Average Diam.-cm	Log Length-m	Basal Area-m2	Percent Rot	Percent Stain	Volume Log	Rot Volume	Stain Volume
1	22.60	2.60	0.040	0.0	25.0	0.104	0.000	0.026
2	19.00	2.60	0.028	0.0	25.0	0.074	0.000	0.018
3	17.70	2.60	0.025	0.0	27.5	0.064	0.000	0.018
4	14.75	2.70	0.017	0.0	27.5	0.046	0.000	0.013
TOTAL TREE			0.11		26.25	0.29		0.07

Clear Wood: 0.213 m3

Tree 4 - Marten Hills Road-Aspen Cut Area

Log	Average Diam.-cm	Log Length-m	Basal Area-m2	Percent Rot	Percent Stain	Volume Log	Rot Volume	Stain Volume
1	17.05	2.60	0.023	0.0	15.0	0.059	0.000	0.009
2	14.70	2.60	0.017	0.0	6.0	0.044	0.000	0.003
3	13.50	2.90	0.014	0.0	7.0	0.041	0.000	0.003
4	11.40	2.60	0.010	0.0	4.5	0.027	0.000	0.001
TOTAL TREE			0.06		8.13	0.17		0.02

Clear Wood: 0.156 m3

Tree 5 - Marten Hills Road-Aspen Cut Area

Log	Average Diam.-cm	Log Length-m	Basal Area-m2	Percent Rot	Percent Stain	Volume Log	Rot Volume	Stain Volume
1	17.90	2.60	0.025	15.0	7.5	0.065	0.010	0.005
2	15.40	2.60	0.019	7.5	10.0	0.048	0.004	0.005
3	13.90	2.60	0.015	0.0	15.0	0.039	0.000	0.006
4	11.50	3.90	0.010	0.0	10.0	0.040	0.000	0.004
TOTAL TREE			0.07	5.63	10.63	0.19	0.013	0.020

Clear Wood: 0.161 m3

Tree 6 - Marten Hills Road-Home Oil Trail

Log	Average Diam.-cm	Log Length-m	Basal Area-m2	Percent Rot	Percent Stain	Volume Log	Rot Volume	Stain Volume
1	27.30	2.60	0.059	0.0	2.5	0.152	0.000	0.004
2	22.80	2.60	0.041	0.0	3.5	0.106	0.000	0.004
3	20.00	2.60	0.031	0.0	1.0	0.082	0.000	0.001
4	16.50	2.60	0.021	0.0	0.0	0.056	0.000	0.000
5	12.30	2.60	0.012	0.0	0.0	0.031	0.000	0.000
TOTAL TREE			0.16		1.4	0.426		0.008

Clear Wood: 0.418 m3

Tree 7 - Marten Hills Road-Home Oil Trail

Log	Average Diam.-cm	Log Length-m	Basal Area-m2	Percent Rot	Percent Stain	Volume Log	Rot Volume	Stain Volume
1	24.50	2.60	0.047	0.0	2.5	0.123	0.000	0.003
2	21.60	2.60	0.037	0.5	7.5	0.095	0.000	0.007
3	18.70	2.60	0.027	5.0	15.0	0.071	0.004	0.011
4	13.10	2.20	0.013	5.0	20.0	0.030	0.001	0.006
TOTAL TREE			0.12	2.63	11.3	0.319	0.006	0.027

Clear Wood: 0.286 m3

Tree 8 - Marten Hills Road-Home Oil Trail

Log	Average Diam.-cm	Log Length-m	Basal Area-m2	Percent Rot	Percent Stain	Volume Log	Rot Volume	Stain Volume
1	26.50	2.60	0.055	23.0	27.0	0.143	0.033	0.039
2	21.30	2.60	0.036	23.0	32.0	0.093	0.021	0.030
3	20.10	2.00	0.032	15.0	50.0	0.063	0.010	0.032
4	13.20	2.40	0.014	0.0	15.0	0.033	0.000	0.005
5	11.30	2.20	0.010	0.0	7.0	0.022	0.000	0.002
TOTAL TREE			0.15	12.20	26.20	0.354	0.064	0.107

Clear Wood: 0.184 m3

DETAILED ACCESS INFORMATION

PRESENT ACCESS

The aspen cutblock is 40 km west along the road and the Home Oil site is 63 km west. The aspen cutblock is <1 km off the road, whereas the Home Oil site is 700m along an old trail to the start of the stand. The stand itself intersects the trail for the entire 1090m it runs. The trail at the south end of the stand is marked for road location.

The Home Oil trail must be widened to accomodate logging equipment and, as it crosses 2 creeks, the birch stand must be logged in winter. The aspen cutblock could be logged in the summer.

ALTERNATIVE ACCESS

There is a road that runs straight North from Smith, along the west end of Fawcett Lake and up to join the Marten Hills road (see Appendix 2 for map location). Presently, there is a washed out culvert in township 75. This culvert could be easily repaired thus providing better access to the Home Oil trail stand, the aspen cutblock and other birch stands in this vicinity. Once repaired, haul trucks would not have to go back west and south to Slave Lake but rather could drive straight south through Smith to highway 44.

APPENDIX VI

Detailed Access Information

ACCESS SUMMARY

The haul distances to Hondo corner are summarized below:

Aspen cutblock

present: 120 km

alternative: 100 km

Home Oil trail

present: 140 km

alternative: 80 km